Vehicle Design

Performance Task

Introduction

There are many ways people get themselves and goods from place to place. A vehicle can be used to take people where they need to go. A vehicle can be a car, truck or bus. Most vehicles have wheels. Vehicles can be used to transport things we buy and sell and for other important jobs. You have been asked to make a vehicle that can be used for a very special need. You will be showing this vehicle to the head of design and production of an auto manufacturing company. An auto manufacturing company produces vehicles. Produce means to make something, you will be helping this company by showing them the vehicle you made.

Big Idea / Essential Questions

Big Idea

- Technology is created, used and changed by humans. Technology is using science and industry to help solve common problems of life. Technology is very helpful to humans.
- Two and three-dimensional objects can be described, put in groups with other similar shapes, and studied by their different parts. Their location can be described quantitatively.

Essential Questions

- In what ways do humans create, use, and change technologies?
- How do we combine shapes to make different shapes?

G.R.A.S.P.

Goal

Your goal is to make a vehicle using geometric shapes. Vehicles are used for transportation.Transportation is how we move things or people from one place to another. Your vehicle will be used for a special need such as public transportation, transporting things to buy and sell and some other jobs.

Role

You are a vehicle designer. You will design your vehicle for a special job based on a special need.

Audience

Your audience is the lead designer of an auto manufacturing company. An auto manufacturing company makes vehicles.

Situation

There are many ways people get themselves and goods from place to place. A vehicle can be used to take people where they need to go. A vehicle can be a car, truck or bus. Most vehicles have wheels. Vehicles also are used to transport things we buy and sell and for other important jobs. You have been asked to make a vehicle that can be used for a very special need. You will be showing this vehicle to the head of design and production of an auto manufacturing company. An auto manufacturing company produces vehicles. Produce means to make something, you will be helping this company by showing them the vehicle you made.

Products

1. Illustration

suggested starting product:

Draw a picture of a vehicle.

- What is a vehicle?
- What kind of vehicle do you use?
- How do vehicles help people?

Illustration - Vehicle Design

Achievement Levels	1	2	3
Illustration (x1)	Illustration is unclear and is not connected to the concept.	Illustration is somewhat clear and demonstrates minimal connection to the concept.	Illustration is clear and demonstrates some connection to the concept.

2. Categorize

As a class, or in small groups, brainstorm and make a list of all the ways people and/or goods are transported. Then, once you have a list, come up with ways you can categorize them. For instance, you can have a category of vehicles with wheels or to get even more specific, categorize by the number of wheels on a vehicle. Decide as a class how you will pick categories. Count all the ideas you come up with. How many different categories did you come up with all together? What category had the most vehicles? Why do you think that category had the most vehicles? Can you categorize your vehicles in different ways?

- What is transportation?
- Why do people use transportation?
- How do you use transportation?
- How many more vehicles were in the category with the most than the category with the least?

Categorizing/Brainstorming - Vehicle Design

Achievement Levels	1	2	3
Math (x1)	Student needs support in counting and comparing quantities of different categories.	Student is somewhat able to count and compare quantities of different categories.	Student is able to count forward (from a number other than one) to compare quantities of different categories.
Participation (x1)	Student is not engaged and does not actively participate in class and/or group activity.	Student is somewhat engaged and somewhat participates in class and/or group activity.	Student is very engaged and actively participates in class and/or group activity.
Social Studies (x1)	Student needs support in understanding the importance and purpose of vehicles as transportation for people and goods.	Student somewhat recognizes the importance and purpose of vehicles as transportation for people and goods.	Student recognizes the importance and purpose of vehicles as transportation for people and goods.

3. Chart/Pictograph

As a class, create a classroom chart or pictograph illustrating the results of the categories activity. Hang it in the classroom.

- What are different types of transportation?
- What is a vehicle?
- How do vehicles move?

Chart/Pictograph - Vehicle Design

Achievement Levels	1	2	3
Participation (x1)	Student is not engaged and does not actively participate in class and/or group activity.	Student is somewhat engaged and somewhat participates in class and/or group activity.	Student is very engaged and actively participates in class and/or group activity.
Drawing (x1)	Symbol/Pictographs drawings need more color or detail.	Symbol/Pictographs drawings are somewhat colorful and may include creative details.	Symbol/Pictographs drawings are colorful and include creative details.
Math (x1)	Student needs support in counting or comparing quantities in categories.	Student is somewhat able to count and compare quantities in categories.	Student is able to count and compare quantities in categories.

4. Collage

Look through magazines to find as many pictures of vehicles as possible. Create a collage using the vehicles you find. Then, look through the collage and try to identify as many shapes as you can. For instance, a tire is a circle and the trailer part of a tractor trailer is a rectangle. Use a marker to outline all the shapes you see in the pictures in your collage. On the back, use tally marks to determine the number of each shape you find. Which shape is used most often in transportation vehicles? Why do you think this is the case?

- What are some types of vehicles?
- Do all vehicles have wheels?
- What are vehicles used for?

Collage - Vehicle Design

Achievement Levels	1	2	3
Shapes (x1)	Student needs support in understanding and recognizing shapes.	Student shows some understanding and recognition of shapes.	Student shows excellent understanding and recognition of shapes.
Participation (x1)	Student is not engaged and does not actively participate in class and/or group activity.	Student is somewhat engaged and somewhat participates in class and/or group activity.	Student is very engaged and actively participates in class and/or group activity.
Counting (x1)	Student needs support in counting and quantifying the number of shapes used on collage.	Student is somewhat able to count and quantify the number of shapes used on collage.	Student is able to count and quantify the number of shapes used on collage.

5. Vehicle Design

1. You are going to design your own vehicle using shapes. Think about the kind of vehicle you would like to create. Does it have wheels? Does it fly? Or, is it a vehicle you use on the water? How will your vehicle be used? Will it transport goods? Will it be used to take people places? Will it travel long distances, like outer space? Decide all these things before you begin creating your vehicle.
2. Tracing/Counting Shapes: Before you begin building your vehicle, you must trace, cut out, and count the shapes you will use. Use shape patterns and construction paper to trace and cut out twenty shapes you will use in your design. You can choose as many of each shape as you like as long as you only have 20 shapes all together.
3. Fuel: All vehicles need some sort of fuel to make them run. Think about the type of fuel you would use for your vehicle. What would you use? Why do you think that is a good choice?
4. Use the shapes to build your vehicle.
5. Write a few sentences telling what the name of your vehicle is, describing how your vehicle works, and what it will be used for. Also explain what you will use as fuel and why.

- What is your favorite vehicle?
- What does your favorite vehicle look like?
- What is your favorite vehicle used for?

Model - Vehicle Design

Achievement Levels	1	2	3
Math (x1)	Model does not demonstrate an understanding of shapes and how they are used in everyday objects.	Model demonstrates little understanding of understanding of shapes and how they are used in everyday objects.	Model demonstrates some understanding of shapes and how they are used in everyday objects.
Science (x1)	Student needs support in understanding the design process to create a successful design.	Student demonstrates some understanding of the design process and shows some creativity and purpose.	Student demonstrates an excellent understanding of the design process and creates a creative design with purpose.
Participation (x1)	Student is not engaged and does not actively participate in class and/or group activity.	Student is somewhat engaged and somewhat participates in class and/or group activity.	Student is very engaged and actively participates in class and/or group activity.
Shapes	Student needs support in finding and identifying shapes to use in	Student uses some shapes to construct	Student uses many shapes to successfully

Achievement Levels	1	2	3
(x1)	constructing a vehicle.	a vehicle.	compose and construct a vehicle.

6. Presentation

Present your vehicle design. Be able to explain how it works, what it will be used for, and what fuel you will use.

- What does your vehicle do?
- How does your vehicle work or move?
- What is your vehicle used for?

Presentation - Vehicle Design

Achievement Levels	1	2	3
Content (x1)	Presentation does not show much focus and the information is disorganized.	Presentation has some focus and some information is organized..	Presentation shows excellent focus and the information is very organized.
Presentation (x1)	Student needs more confidence in showing eye contact to speak more clearly.	Student shows some confidence and and has eye contact while speaking clearly.	Student shows excellent confidence and and has good eye contact while speaking very clearly.
Engineering (x1)	Student needs support in understanding and/or demonstrating the structure and the function of the vehicle design.	Student somewhat demonstrates the structure and the function of the vehicle design.	Student clearly demonstrates the structure and the function of the vehicle design.

7. Journal Prompt

Suggested final product can be written or orally dictated.

Tell me what you learned about vehicles.

- What have you learned about vehicles?
- How many different kinds of vehicles can you describe?
- What do vehicles move?

Journal Prompt - Vehicle Design

Achievement Levels	1	2	3	4
Conventions (if student response is written) (x1)	Entry does not indicate an attempt at phonetic construction.	Entry includes phonetic construction of words. Does not include capitalization or punctuation.	Entry includes some sight words spelled correctly and phonetic construction of unknown words. May include capitalization or punctuation.	Entry includes sight words and phonetic construction of unknown words. May include capitalization or punctuation.
Content (x1)	Response contains a limited amount of accurate, factual information.	Response contains some accurate, factual information about the topic.	Response contains mostly accurate, factual information about the topic.	Response contains accurate, factual information about the topic.
Shapes in Geometry (x1)	Not able to identify or correctly name any shapes used in vehicle design.	Identifies and correctly names one or two shapes that may be used in vehicle design.	Can identify and correctly name different shapes used in vehicle design.May include two or three dimensional shapes.	Clearly identifies and correctly names several different shapes, including two or three dimensional shapes that may be used in vehicle design.
Oral Dictation				

Achievement Levels	**1**	**2**	**3**	**4**
(if journal response is given orally) (x1)	Student response is not audible and lacks coherent sentences.	Student response is partially audible and uses somewhat coherent sentences.	Student response demonstrates audible speaking in mostly coherent sentences.	Student response demonstrates audible speaking in coherent sentences.